CONTACT DUPLICATING AND RESEAU PRINTER

AND

HIGH RESOLUTION STEP AND REPEAT PRINTER

FIFTEENTH MONTHLY LETTER REPORT

October 10, 1965

Period: September 1, 1965 to October 1, 1965

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1.0 CONTACT DUPLICATING AND RESEAU PRINTER

1.1 Purpose

The over-all objective of the current contract is the design, fabrication, test and delivery of a Photographic, Step and Repeat, Contact Duplicating and Reseau Printer. Prime design goals are high-speed automatic operation, variable format capability and high resolution with minimum film distortion or damage. The delivered equipment will be suitable for operational use. The printer will accommodate films of 70 mm to 9½" width with frame lengths up to 30 inches and will provide operation in the reseau mode and selective mode as options.

1.2 Activity of this Report Period

Fabrication and assembly of the deliverable printer continued this month with the assembly of the film transport mechanism and completion and wiring of the multiple-lamp chassis and D.C. power supply. Fabrication of the printed circuit boards for the automatic exposure control are completed and they are now ready for installation. Preliminary wiring will permit raising and lowering of the air-bag mechanism and manual operation of the transport and multiple lamp assembly so that full 9" x 30" exposures may be made for initial adjustments.

Remaining problems are design and fabrication of the control chassis, frame sensing circuits, and completion of the machine wiring.

The design for the Pre-View and Punch station has been completed and fabrication has been started. A breadboard punch mechanism was fabricated and successfully used to punch all thicknesses of film from 2.5 to 7 mils in both estar and acetate base. The punch station design will incorporate a single microscope in the initial assembly which can be moved to three stations for punching; however, should additional microscopes and simultaneous punching be found to be required, additional microscopes and punches may have to be added.

The frame edge detection circuit was completely redesigned and a new breadboard was fabricated and assembled and is presently undergoing tests. The design will incorporate silicon photocells and a density coincidence and impulse circuit which should produce reliable sensing under the density variations found to exist in the data recently provided by the technical monitors. Although most frame edges will be detected by the new system, it will not be able to detect those that have less than 0.2 density difference with respect to the picture area along the entire length of the frame edge.

In these cases, a circuit will indicate that, after a predetermined amount of film has been transported without detecting a frame edge, a malfunction or skipped frame has occurred.

Upon completion of the edge-sensing breadboard, the device will once again be tested in Washington with typical films provided

by the technical monitors. Fabrication of test materials for the printer tests has been initiated based on verbal approval of the test plan by the technical monitors.

1.3 Plans for Next Period

Assembly and wiring of the deliverable printer will continue and preliminary testing will be started. Fabrication and assembly of the frame-edge sensors will be initiated upon completion of satisfactory tests in Washington of the breadboard test device.

1.4 Problems

Completion of the print station and transport assemblies is dependent upon rapid approval of the frame-sensing device.

The Contracting Officer has been supplied with justification for change of contract scope resulting in a two-month extension of the delivery of the printer

1.5 Documentation

STAT In a meeting held at [ ] on September 21, 1965, with the technical monitor of Printer #2, verbal approval of the Test Plan by the technical monitors was transmitted to [ ] STAT

1.6 Questions Outstanding

There are no outstanding questions this month.

2.0 HIGH RESOLUTION STEP AND REPEAT PRINTER

2.1 Purpose

The purpose of this effort is to design, fabricate, test and deliver a high precision, step and repeat photographic contact

printer. This printer will be capable of producing photographic contact prints of the highest possible quality, resolution and acutance from roll films of width varying from 70 mm to 9½" and in preselected frame lengths from 5 inches up to a maximum of 30 inches.

2.2 Activity of This Report Period

2.2.1 Exposure Control and Light Source

A series of quantitative film tests was performed utilizing 8430 and 5427 film and controlled darkroom processing. From the resultant data, the lamp intensity in meter candles has been calculated for use in setting the constants for the exposure control development.

The log amplifier was completed and tests indicate a noise problem exists which is under investigation. Concurrent investigations of a commercial log amplifier manufactured by [redacted] has been initiated and preliminary results are very encouraging. Use of the commercial amplifier can result in economy of space and power. STAT

2.2.2 Film Gate and Scan Drive

Four types of variable speed D.C. motors were tested and found to have inadequate acceleration at the required 1800 RPM, and poor velocity regulation at 450 and 150 RPM. A decision has been made to use an 1800 RPM synchronous motor with a clutch-gear

system to provide either a 30 or 7½ in/sec. scan with a 30 in/sec. return. This motor has been used successfully on the breadboard with adequate acceleration and no evidence of photographic banding.

2.2.3 Film Transport

Design of the frame separation detection station has been completed and tests utilizing positive film with dense frame separations indicate unsatisfactory operation. Bench tests incorporating a design change recommended by the technical monitor are being conducted, but it is not expected that sufficient light energy will be available for positive frame sensing.

My choice would use only one pass through the fiber instead of two passes.

The variable damper has been assembled and qualitative tests were performed on the breadboard printer. The damping coefficient was found to be lower than expected and modifications are in progress to increase the damping coefficient prior to retest.

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A latent failure of a component in the storage loop amplifier has resulted in a circuit redesign, replacing a silicon control rectifier with a power transistor. The circuit modification is in progress and should result in more reliable operation.

2.2.4 Other Activities

Effort this month has been concentrated in layout design for the printer. The viewer and escapement assembly design which includes light baffling and sealing to prevent light from entering the printer through the viewer has been essentially completed. Other designs, including the control panel, lamphouse and frame,

are progressing satisfactorily and nearing completion. The rolling air bag has been redesigned to improve the method of clamping and sealing. A table of contents for an operators and maintenance manual is in preparation for submittal next month.

2.3 Plans for Next Reporting Period

Testing of the breadboard will continue in the areas of transport and exposure control. Completion of design and drafting in some areas will initiate fabrication and procurement of components for the deliverable printer.

2.4 Problems

Completion of circuitry to permit exposure control tests will have top priority next month.

The technical monitor at a meeting at [redacted] on September 21, 1965, indicated there may be a future requirement to sense positive film frame edges. Investigation of the capabilities of the present system in this direction is underway. STAT

WHAT! this was discussed many times before 21 Sept.

The Contracting Officer has been supplied with justification for change in contract scope resulting in a one month extension of the delivery of the printer. about 5 months late!

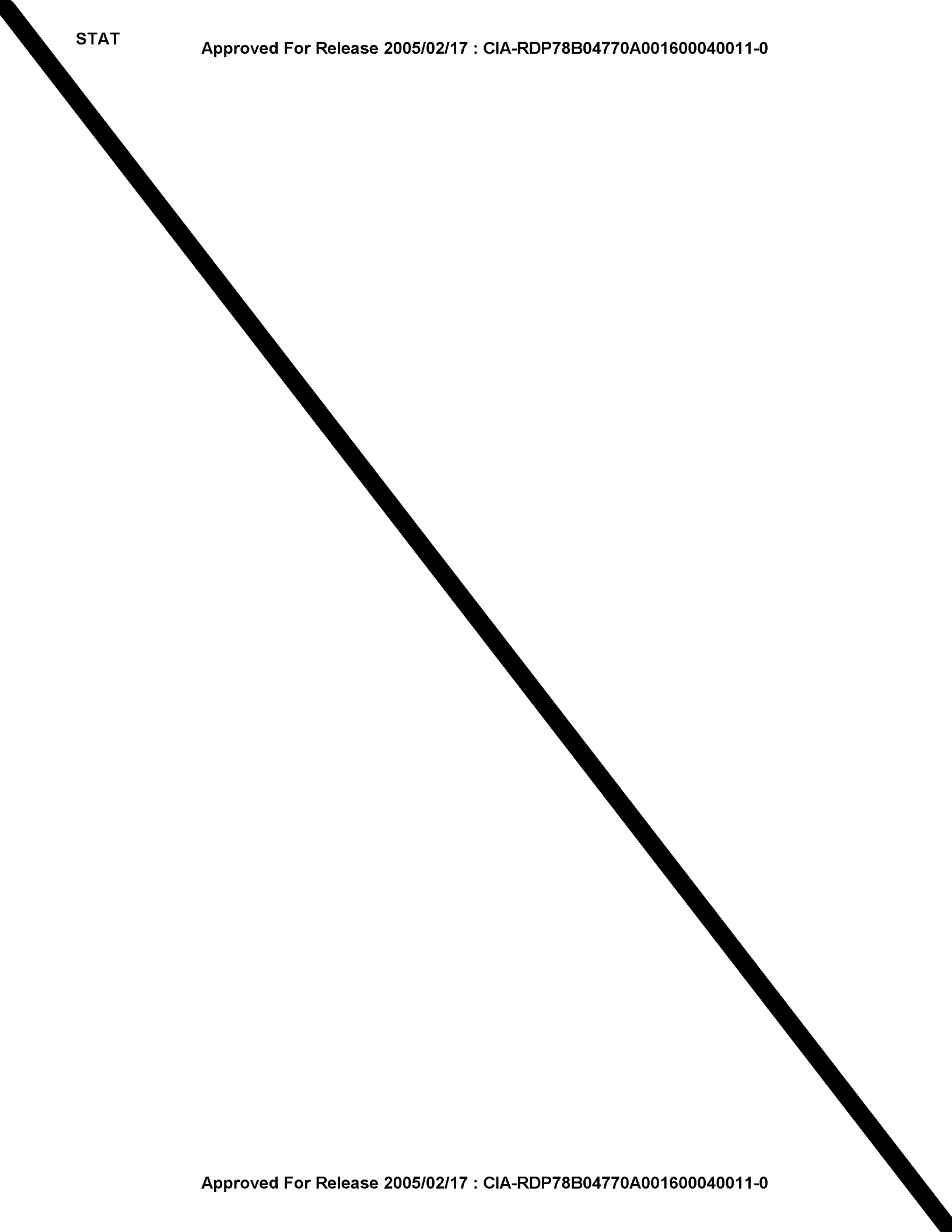
2.5 Documentation

A chart of customer facility voltage variation was submitted by the technical monitor and appears to indicate that the regulation will present no problem for operation of the printer, if the

voltage remains within the limits of this data.

2.6 Questions Outstanding

There are no questions outstanding this month.



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